**The therapeutic effects of Spirulina algae on COVID-19 hospitalized patients: A randomized clinical trial**

Davood Attaran1, Amir Baniasad2, Mohammad Javad Najafzadeh3, Farid Poursadegh1\*, Mohammad Reza Saberi4, Shima Nabavi5, Sahar Ravanshad5, Mahnaz Mozdourian1, Sepideh Hejazi1, Negar Morovatdar6, Soroush Attaran1

1 Lung Diseases Research Center, Mashhad University of Medicine Sciences, Mashhad, Iran.

2 Endocrinology and Metabolism Research Center, Institute of Basic and Clinical Physiology Science, Kerman University of Medical Sciences, Kerman, Iran.

3 Gastroenterology and Hepatology Research Center, Institute of Basic and Clinical Physiology Sciences, Kerman University of Medical Sciences, Kerman, Iran.

4Bioinformatics Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

5Department of Internal Medicine, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

6Clinical Research Development Unit, Imam Reza Hospital, Mashhad University of Medical Sciences, Mashhad, Iran.

\***Corresponding author:**

Farid Poursadegh, MD, Lung Diseases Research Center, Mashhad University of Medicine Sciences, Mashhad, Iran.

E-mail address: [poursadeghfr@mums.ac.ir](mailto:poursadeghfr@mums.ac.ir)

**Abstract**

**Background:** Spirulina algae have been widely used in food, cosmetic and dietary applications, and its antiviral and immune-enhancing properties have been reported in laboratory and clinical studies.

**Objective:** To evaluate the prescription of spirulina as a safe food supplement that has antiviral properties and N-acetylcysteine in the treatment of hospitalized patients due to COVID-19

**Methods:** This study was conducted as a multi-center, randomized, single-blind, open-label phase II clinical trial on 66 patients with COVID-19. Patients were randomly assigned to two intervention groups and one control group. The intervention groups were defined as follows; the group receiving spirulina algae (23 people) and the group receiving N-acetylcysteine + spirulina algae (21 people). In the control group (22 people), the patients only received the national standard treatment for COVID-19. The intervention groups prescribed 6 grams of spirulina green algae daily (80 mg/kg). The outcomes were the effectiveness of the spirulina ​​on the duration of hospitalization, the rate of admission in the intensive care unit (ICU), and the mortality; patients were followed up during hospitalization and up to three months after that. The study outcomes were compared at the significance level of p<0.05.

**Results:** The duration of hospitalization (P = 0.874), ICU admission (P = 0.320), and mortality (P = 0.320) of patients between the three groups did not show any significant difference. Regarding side effects, the control group showed a minor incidence of headache (P = 0.022) and nausea (P = 0.039). No statistically significant difference was observed regarding the frequency of symptoms after discharge in the three months follow-up (P = 0.420).

**Conclusions:** Our study showed that administering spirulina with or without N-acetylcysteine does not affect the length of hospitalization, hospitalization in the ICU, mortality, and the frequency of symptoms or long COVID.

**Keywords**: spirulina algae,antiviral, N-acetyl cysteine, COVID-19**.**